U.S. Army Corps of Engineers
Project : Remedial Suite No. 1

Green River LD 3
30% Design Cost Estimate
Green River
Lock and Dam 3
Rochester, Kentucky

Estimated by Erin Mattmiller, EIT April Welshans, EIT
Designed by April Welshans, EIT Jeffrey Dingrando, PE
Prepared by Erin Mattmiller, EIT Tom Pace, PE
Preparation Date 5/9/2011
Effective Date of Pricing 3/1/2016
Estimated Construction Time 130 Days

Designed by
April Welshans, EIT Jeffrey Dingrando, PE

Estimated by
Erin Mattmiller, EIT April Welshans, EIT

Prepared by
Erin Mattmiller, EIT Tom Pace, PE

Design Document 30% Design Document
Document Date 5/9/2011

District Louisville
Contact Jeffrey Esterle, PE, PG

Budget Year 2011
UOM System Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost

Timeline/Currency
Preparation Date 5/9/2011
Escalation Date 3/1/2016
Eff. Pricing Date 3/1/2016
Estimated Duration 130 Day(s)

Currency US dollars
Exchange Rate 1.000000

Costbook CB10EB: MII English Cost Book 2010

Labor KY100192: General Decision Number: KY100192 10/15/2010 KY192
Note: http://www.wdol.gov General Decision Number: KY100192 04/01/2011 KY192 State: Kentucky
Construction Type: Heavy Including Water and Sewer Line Construction. Counties: Ballard, Caldwell, Calloway, Carlisle, Crittenden, Fulton, Graves, Hickman, Hopkins, Livingston, Lyon, Marshall, McCracken, Muhlenberg, Ohio, Todd and Union Counties in Kentucky.

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP09R02: MII Equipment Region 2 2009

02 MIDEAST

Sales Tax	6.00
Working Hours per Year	1,450
Labor Adjustment Factor	1.02
Cost of Money	4.88
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.094
Gas	2.960
Diesel Off-Road	3.040
Diesel On-Road	3.590

Shipping Rates

Over 0 CWT	9.19
Over 240 CWT	8.46
Over 300 CWT	7.61
Over 400 CWT	6.83
Over 500 CWT	4.13
Over 700 CWT	4.13
Over 800 CWT	6.14

Currency in US dollars

Date	Author	Note
5/4/2011	Erin Mattmiller	SUMMARY OF SCOPE OF WORK This estimate outlines the costs (estimated at the 30% design phase) for the repair of the rock-filled timber crib dam and work at the lock. In select areas, derrick stone on the face of the rock-filled timber crib dam will be replenished, back to the approximate grade at which it was installed. In addition, the new derrick stone will be slush grouted in place. The upper lock gates will be buttressed with derrick stone and the lower gates will be pinned open to facilitate egress and to limit accumulation of sediment in the chamber. EFFECTIVE DATE OF PRICING AND ESCALATION: In order to compare costs between suites, the effective date of pricing for all three suites, including Suite 1, is 3/1/2016 which corresponds to the midpoint of construction for Suite 3. All project items were escalated from 1/1/2010 to 3/1/2016. Items obtained from sources other than the 2010 Cost Book were first escalated to 1/1/2010 then escalated to 3/1/2016 with the 2010 Cost Book items. JOB OFFICE OVERHEAD (JOOH) The JOOH markups for the Prime Contractor and Subcontractor were calculated as running percentages of 6% and 10%, respectively per the direction from James J. Vermillion, CCC, Cost Engineer, USACE Louisville District, based on his experience with similar projects at the 30% design level. The markups can be adjusted if needed at later design levels and also if the contract acquisition is known for sure. A JOOH Direct Cost Report is provided to document the anticipated overhead items necessary to complete the project; however, the costs reported on the JOOH Direct Cost Report are not a part of the Contract or Project Cost. ASSUMPTIONS: 1. The contractor can perform the work in one, 4-month construction season beginning in May 2015 and concluding in August 2015. 2. The MATOC structure for contracting was used to build this estimate where the Prime Contractor administers the construction contract and the Sub Contractor performs all of the construction work. 3. Contingency and SIOH are calculated as flat rates of 25% and 8%, respectively, across the total project per the direction of James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. 4. Kentucky State Sales Tax is applied to all material costs and rental costs for the USR equipment items consisting of the material transport barge, work barge, and 150-ton crawler crane. These items were not listed in the 2010 Cost Book so rental rates were obtained from the 2006 and 2008 RS Means Cost Data and escalated first to 2010, then to 2016 with the 2010 Cost Book items. 5. Labor rates were obtained from http://www.wdol.gov General Decision Number: KY100192 04/01/2011 KY192 State: Kentucky Construction Type: Heavy Including Water and Sewer Line Construction Counties: Ballard, Caldwell, Calloway, Carlisle, Crittenden, Fulton, Graves, Hickman, Hopkins, Livingston, Lyon, Marshall, McCracken, Muhlenberg, Ohio, Todd and Union Counties in Kentucky. 6. Costs for Planning, Engineering, and Design were calculated as 8% of the total Project Direct Cost for all items except for Planning, Engineering, and Design per the direction of James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. 7. No acquisition of real estate is necessary for the project since all of the project area is owned by the United States of America. 8. Traffic control is minimal and the project area is closed to the public (no traffic).

Labor ID: KY100192 EQ ID: EP09R02 Currency in US dollars TRACES MII Version 4.1

Date **Author** **Note**

9. All river and lock excavation will be accomplished by dredging with a barge-mounted crane and clamshell bucket.

10. The following bulking factors are used for estimating disposal volumes:

Bulking for demolished concrete and excavated rock 1.50
Bulking for demolished steel 2.00
Bulking for excavated soils 1.30

11. The haul distance to the disposal site for all disposal materials is assumed as 15 miles round trip.

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Direct Cost Markups	**Category**	**Method**
Productivity	Productivity	Productivity
Overtime	Overtime	Overtime

	Days/Week	*Hours/Shift*	*Shifts/Day*	*1st Shift*	*2nd Shift*	*3rd Shift*
Standard	*5.00*	*10.00*	*1.00*	*8.00*	*0.00*	*0.00*
Actual	*5.00*	*10.00*	*1.00*	*8.00*	*0.00*	*0.00*

Day	*OT Factor*	*Working*	*OT Percent*	*FCCM Percent*
Monday	*2.00*	*Yes*	*25.00*	*0.00*
Tuesday	*2.00*	*Yes*		
Wednesday	*2.00*	*Yes*		
Thursday	*2.00*	*Yes*		
Friday	*2.00*	*Yes*		
Saturday	*2.00*	*No*		
Sunday	*2.00*	*No*		

Sales Tax	TaxAdj	Running % on Selected Costs
MatlCost		

Contractor Markups	**Category**	**Method**
Prime JOOH	JOOH	Running %
Sub JOOH	JOOH	Running %
HOOH	HOOH	Running %
Prime Profit	Profit	Profit Weighted Guidelines

Guideline	*Value*	*Weight*	*Percentage*
Risk	*0.040*	*20*	*0.80*
Difficulty	*0.040*	*15*	*0.60*
Size	*0.030*	*15*	*0.45*
Period	*0.030*	*15*	*0.45*
Invest (Contractor's)	*0.030*	*5*	*0.15*
Assist (Assistance by)	*0.030*	*5*	*0.15*
SubContracting	*0.120*	*25*	*3.00*
Total		*100*	*5.60*

Sub Profit	Profit	Profit Weighted Guidelines

Guideline	*Value*	*Weight*	*Percentage*
Risk	*0.100*	*20*	*2.00*
Difficulty	*0.100*	*15*	*1.50*
Size	*0.030*	*15*	*0.45*
Period	*0.120*	*15*	*1.80*
Invest (Contractor's)	*0.080*	*5*	*0.40*
Assist (Assistance by)	*0.110*	*5*	*0.55*
SubContracting	*0.030*	*25*	*0.75*
Total		*100*	*7.45*

Bond	Bond	Running %
Excise Tax	Excise	Running %
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Currency in US dollars

Owner Markups
Escalation

StartDate
1/1/2010

Contingency
SIOH

Category
Escalation

StartIndex	*EndDate*
720.27	*3/1/2016*

Contingency
SIOH

Method
Escalation

EndIndex	*Escalation*
791.90	*9.94*

Running %
Running %

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Project Cost Summary Report			**529,270**	**52,609**	**145,470**	**58,188**	**785,537**
			140,629.60				*208,721.05*
Dams	**1.00**	**EA**	**140,630**	**13,979**	**38,652**	**15,461**	**208,721**
			140,629.60				*208,721.05*
Main Dam	**1.00**	**EA**	**140,630**	**13,979**	**38,652**	**15,461**	**208,721**
			112,181.76				*166,499.04*
Derrick Stone	**1.00**	**EA**	**112,182**	**11,151**	**30,833**	**12,333**	**166,499**
			89.75	*9.94%*	*27.49%*	*10.99%*	*133.20*
Derrick Stone Placement	1,250.00	TON	112,182	11,151	30,833	12,333	166,499
(Note: The USR CSI Task for derrick stone was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from Greenville Quarries, Contact is John Stovall (270) 338-2300. $48/ton for derrick stone delivered by truck to site, includes unloading time for delivery and truck driver. Production rate of 100 tons/hour derived by calculating the total time for placement of 900 tons of derrick stone. The calculation of the total time to place all of the derrick stone accounted for the time to complete the following tasks: -unload the rock from the delivery truck; -load the rock onto the material transport barge; -travel time for the barge; -unload the rock from the barge; and -placement of the derrick stone. The production rate was calculated by dividing 900 tons by the total time to place 900 tons (9 hours) which equals 100 tons/hour. The equipment for the crew consists of 2 cranes, 1 material transport barge, 1 work barge, and a tug boat. The labor for the crew for this task consists of 1 medium equipment operator that serves as the tug boat captain, 1 foreman, 1 equipment oiler, and 2 heavy equipment operators for the 2 cranes. The quantity for derrick stone was calculated by determining the area of placement and multiplying by a depth of 10 feet to get the volume of stone in cubic yards. A unit weight of 110 lb/cubic foot that accounts for porosity was used to convert from cubic yards of stone to tons.)								
			28,447.85				*42,222.01*
Tremie Concrete	**1.00**	**EA**	**28,448**	**2,828**	**7,819**	**3,128**	**42,222**
			189.65	*9.94%*	*27.48%*	*10.99%*	*281.48*
Structural concrete, ready mix, normal weight, 3500 psi, includes local aggregate, sand, Portland cement and water, delivered, excludes all additives and treatments	150.00	CY	28,448	2,828	7,819	3,128	42,222
(Note: This item covers concrete for slush grouting the derrick stone and the timber frame repairs. This USR CSI Task for tremie concrete was built by copying the the 03 31 05 35 0200 CSI Task from the Cost Book which provided only material costs and adding the Tremie Concrete Crew for labor and equipment costs.Add $1.05 per CY for Environmental and Energy Charges and $14.00 per cubic yard for anti wash out treatment per direction from a quote from imi, a local concrete vendor. So total material price/CY is $106.55/CY. Production rate is 100 CY/Hour Based on experience at KY River L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of concrete for slush grouting (120 CY) was calculated by multiplying the plan area of derrick stone placement and slush grouting by an assumed depth. The assumed depth for slush grouting was calculated by assuming that the slush grouting will extend to half of the depth of the derrick stone (10 feet); therefore, the assumed depth of slush grouting was calculated as 5 feet. The volume of concrete for repairs to the timber frame (360 CY) was calculated by determining the timber crib surface area (beneath the reinforced concrete cap) and multiplying the area by an assumed placement depth of 2 feet.)								
			356,587.65				*529,243.83*
Locks	**1.00**	**EA**	**356,588**	**35,445**	**98,008**	**39,203**	**529,244**
			1,798.58				*2,669.43*
Demolish Railing Parallel to Land Lock Wall	**1.00**	**EA**	**1,799**	**179**	**494**	**198**	**2,669**
			3.82	*9.94%*	*27.49%*	*10.99%*	*5.67*
Selective demolition, misc metal fences & gates, metal tubular picket fences, 4'-6' high	320.00	LF	1,223	122	336	134	1,815
			38.39	*9.94%*	*27.48%*	*10.99%*	*56.98*
Selective demolition, disposal only, urban buildings with salvage value allowed, steel frame, includes loading and 5 mile haul to dump	15.00	CY	576	57	158	63	855
(Note: Increase bare cost by a factor of 3.0 since a 15-mile haul to dump is assumed for the project. Disposal Volume = 2 x Volume of posts and rails to account for bulking.)							
			18,760.79				*27,844.57*
Replace Railing Parallel to Land Lock Wall	**1.00**	**EA**	**18,761**	**1,865**	**5,156**	**2,063**	**27,845**

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			58.63	*9.94%*	*27.49%*	*10.99%*	*87.01*
Railing, pipe, steel, primed, 2 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	320.00	LF	18,761	1,865	5,156	2,063	27,845
			262.05				*388.93*
Safety Signage	**1.00**	**EA**	**262**	**26**	**72**	**29**	**389**
			43.67	*9.94%*	*27.48%*	*10.99%*	*64.82*
Safety signs (yellow and magenta), aluminum/acrylic, 10" x 14"	6.00	EA	262	26	72	29	389
			185,326.57				*275,059.84*
Dredging to Open Gates	**1.00**	**EA**	**185,327**	**18,421**	**50,937**	**20,375**	**275,060**
			20.04	*9.94%*	*27.48%*	*10.99%*	*29.75*
Mechanical dredging, 20 miles, barge mounted clamshell excavation into scows, dumped at sea, minimum	2,500.00	BCY	50,106	4,981	13,772	5,509	74,367
(Note: The dredging volume was calculated by (1) dividing the dredging area into sections in plan view, (2) multiplying the plan area of each section by the average of the excavation depths at the beginning of the section and end of the section to get a volume, and (3) adding the volumes of each section to get a total dredging volume.)							
			41.61	*9.94%*	*27.48%*	*10.99%*	*61.75*
Spoil Disposal	3,250.00	LCY	135,220	13,441	37,165	14,866	200,693
(Note: The Spoil Disposal task is made up of three items from the 2010 Cost Book: (1) 31 23 23 20 1625 Cycle hauling (wait, load,travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 30 min load/wait/unload, 12 CY truck, cycle 10 miles, 15 MPH, excludes loading equipment; (2) 31 23 16 42 0500 Excavating, bulk bank measure, 1/2 C.Y. capacity = 20 C.Y./hour, clamshell, excluding truck loading; (3) 31 23 23 17 0020 Fill, dumped material, spread, by dozer, excludes compaction. Spoil Disposal Volume = Total Dredging Volume x 1.30 (bulking factor for excavated soils).)							
			14,306.72				*21,233.89*
Pin Lower Gates Open	**1.00**	**EA**	**14,307**	**1,422**	**3,932**	**1,573**	**21,234**
(Note: The tie-back consist of a W section, a thin steel plate, and an anchor rod. The W-section size was assumed to be a W8x58 section based on similar designs at Kentucky River Lock No. 5, 6, & 7. Since this size was unavailable in 2010 RS Means, the larger W12x58 was chosen. The extra material and cost of the W12x58 was assumed to account for the steel required for the steel plate and anchor rod. Due to limited design drawings, the actual geometry of the lock gates and stiffeners is unknown. Therefore, the length of the weld between the W section and the gate stiffener was assumed to be 6 linear feet per W section.)							
			119.95	*9.94%*	*27.49%*	*10.99%*	*178.02*
Structural steel member, 100-ton project, 1 to 2 story building, W12x58, A992 steel, shop fabricated, incl shop primer, bolted connections	70.00	LF	8,396	835	2,308	923	12,462
			29.06	*9.94%*	*27.49%*	*10.99%*	*43.13*
Welding structural steel in field, single pass, 0.4 Lb/LF, 5/16" thick, continuous fillet, type 6011	50.00	LF	1,453	144	399	160	2,156
			89.15	*9.94%*	*27.48%*	*10.99%*	*132.31*
Welding structural steel in field, cleaning & welding plates/bars/rods to existing beams/columns/trusses	50.00	LF	4,457	443	1,225	490	6,616
			16,477.40				*24,455.60*
Restore Concrete Esplanade	**1.00**	**EA**	**16,477**	**1,638**	**4,529**	**1,812**	**24,456**
			36.62	*9.94%*	*27.48%*	*10.99%*	*54.35*
Concrete paving surface treatment, 4500 psi, fixed form, unreinforced, 12' pass, 6" thick, includes joints, finishing, and curing	450.00	SY	16,477	1,638	4,529	1,812	24,456
(Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)							
			35,341.85				*52,454.02*
Bracing	**1.00**	**EA**	**35,342**	**3,513**	**9,714**	**3,885**	**52,454**
(Note: Bracing is based on that used at KY River L&D3. The bracing consisted of heavy steel sections. The sections used here are similar, although some adjustments have been made to avoid using sections not found in the UPB. The quantities for each section used have been adapted for the geometry of the cells at Green River L&D3)							

Currency in US dollars

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
			294.52	*9.94%*	*27.48%*	*10.99%*	*437.12*
Structural steel member, 100-ton project, 1 to 2 story building, W36x150, A992 steel, shop fabricated, incl shop primer, bolted connections	120.00	LF	35,342	3,513	9,714	3,885	52,454
			2,799.95				*4,155.65*
Restore Portion of County Road 1273 as Gravel Road	**1.00**	**EA**	**2,800**	**278**	**770**	**308**	**4,156**
(Note: This item covers restoration for a 140-foot-long and 15-foot-wide section of County Road 1273.)							
			11.67	*9.94%*	*27.48%*	*10.99%*	*17.32*
Temporary, roads, gravel fill, 4" gravel depth, excl surfacing	240.00	SY	2,800	278	770	308	4,156
			914.07				*1,356.65*
Site Restoration	**1.00**	**EA**	**914**	**91**	**251**	**100**	**1,357**
(Note: This item covers grading and seeding for an area equal to the clearing and grubbing area.)							
			0.22	*9.94%*	*27.48%*	*10.99%*	*0.32*
Fine grading, slopes, gentle, finish grading	1,000.00	SY	218	22	60	24	324
			0.70	*9.94%*	*27.49%*	*10.99%*	*1.03*
Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed	1,000.00	SY	696	69	191	77	1,033
(Note: This item covers seeding for an area equal to the clearing and grubbing area.)							
			24,060.08				*35,709.73*
Sheet Piling	**1.00**	**EA**	**24,060**	**2,392**	**6,613**	**2,645**	**35,710**
			30.08	*9.94%*	*27.48%*	*10.99%*	*44.64*
Sheet piling, steel, 27 psf, 20' excavation, drive, extract and salvage, excludes wales	800.00	SF	24,060	2,392	6,613	2,645	35,710
(Note: Braced sheet piles will serve as the temporary bulkhead wall at the lock. The area of sheet piling was calculated by multiplying the bulkhead height by the lock chamber width. The bulkhead height is the height from the top of the lock wall to the elevation of the upper sill.)							
			56,539.61				*83,915.52*
Derrick Stone	**1.00**	**EA**	**56,540**	**5,620**	**15,540**	**6,216**	**83,916**
			89.75	*9.94%*	*27.49%*	*10.99%*	*133.20*
Derrick Stone Placement	630.00	TON	56,540	5,620	15,540	6,216	83,916
(Note: The USR CSI Task for derrick stone was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from Greenville Quarries, Contact is John Stovall (270) 338-2300. $48/ton for derrick stone delivered by truck to site, includes unloading time for delivery and truck driver. Production rate of 100 tons/hour derived by calculating the total time for placement of 900 tons of derrick stone. The calculation of the total time to place all of the derrick stone accounted for the time to complete the following tasks: -unload the rock from the delivery truck; -load the rock onto the material transport barge; -travel time for the barge; -unload the rock from the barge; and -placement of the derrick stone. The production rate was calculated by dividing 900 tons by the total time to place 900 tons (9 hours) which equals 100 tons/hour. The equipment for the crew consists of 2 cranes, 1 material transport barge, 1 work barge, and a tug boat. The labor for the crew for this task consists of 1 medium equipment operator that serves as the tug boat captain, 1 foreman, 1 equipment oiler, and 2 heavy equipment operators for the 2 cranes. This item covers the derrick stone for the buttress at the upper gates. The rock volume was calculated by (1) dividing the rock placement area into sections in plan view, (2) multiplying the plan area of each section by the average of the rock depths at the beginning of the section and end of the section to get a volume, (3) adding the volumes of each section to get a total volume of rock, and (4) multiplying the total volume of rock by a unit weight of 110 tons/CF that accounts for porosity to get the rock quantity.)								
			32,052.39				*47,571.84*
Planning, Engineering and Design	**1.00**	**EA**	**32,052**	**3,186**	**8,810**	**3,524**	**47,572**
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of $337,702 which corresponds to the total project direct costs for all items except for Planning, Engineering, & Design.)							
Planning, Engineering, & Design	1.00	LS	32,052	3,186	8,810	3,524	47,572
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of $335,840 which corresponds to the total project direct cost for all items except for Planning, Engineering, & Design.)							

Labor ID: KY100192 EQ ID: EP09R02 | Currency in US dollars | TRACES MII Version 4.1

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
Contract Cost Summary Report				**362,708**	**80,953**	**443,662**	**85,608**	**529,270**
				94,986.79		*117,883.12*		*140,629.60*
04 Dams	**1.00**	**EA**	**Sub**	**94,987**	**22,896**	**117,883**	**22,746**	**140,630**
				94,986.79		*117,883.12*		*140,629.60*
0401 Main Dam	**1.00**	**EA**	**Sub**	**94,987**	**22,896**	**117,883**	**22,746**	**140,630**
				75,771.99		*94,036.64*		*112,181.76*
Derrick Stone	**1.00**	**EA**	**Sub**	**75,772**	**18,265**	**94,037**	**18,145**	**112,182**
				60.62		*75.23*		*89.75*
USR USR Derrick Stone Placement	1,250.00	TON	Sub	75,772	18,265	94,037	18,145	112,182
(Note: The USR CSI Task for derrick stone was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from Greenville Quarries, Contact is John Stovall (270) 338-2300. $48/ton for derrick stone delivered by truck to site, includes unloading time for delivery and truck driver. Production rate of 100 tons/hour derived by calculating the total time for placement of 900 tons of derrick stone. The calculation of the total time to place all of the derrick stone accounted for the time to complete the following tasks: -unload the rock from the delivery truck; -load the rock onto the material transport barge; -travel time for the barge; -unload the rock from the barge; and -placement of the derrick stone. The production rate was calculated by dividing 900 tons by the total time to place 900 tons (9 hours) which equals 100 tons/hour. The equipment for the crew consists of 2 cranes, 1 material transport barge, 1 work barge, and a tug boat. The labor for the crew for this task consists of 1 medium equipment operator that serves as the tug boat captain, 1 foreman, 1 equipment oiler, and 2 heavy equipment operators for the 2 cranes. The quantity for derrick stone was calculated by determining the area of placement and multiplying by a depth of 10 feet to get the volume of stone in cubic yards. A unit weight of 110 lb/cubic foot that accounts for porosity was used to convert from cubic yards of stone to tons.)									
				19,214.80		*23,846.48*		*28,447.85*
Tremie Concrete	**1.00**	**EA**	**Sub**	**19,215**	**4,632**	**23,846**	**4,601**	**28,448**
				128.10		*158.98*		*189.65*
USR USR_033105350200 Structural concrete, ready mix, normal weight, 3500 psi, includes local aggregate, sand, Portland cement and water, delivered, excludes all additives and treatments	150.00	CY	Sub	19,215	4,632	23,846	4,601	28,448
(Note: This item covers concrete for slush grouting the derrick stone and the timber frame repairs. This USR CSI Task for tremie concrete was built by copying the the 03 31 05 35 0200 CSI Task from the Cost Book which provided only material costs and adding the Tremie Concrete Crew for labor and equipment costs.Add $1.05 per CY for Environmental and Energy Charges and $14.00 per cubic yard for anti wash out treatment per direction from a quote from imi, a local concrete vendor. So total material price/CY is $106.55/CY. Production rate is 100 CY/Hour Based on experience at KY River L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of concrete for slush grouting (120 CY) was calculated by multiplying the plan area of derrick stone placement and slush grouting by an assumed depth. The assumed depth for slush grouting was calculated by assuming that the slush grouting will extend to half of the depth of the derrick stone (10 feet); therefore, the assumed depth of slush grouting was calculated as 5 feet. The volume of concrete for repairs to the timber frame (360 CY) was calculated by determining the timber crib surface area (beneath the reinforced concrete cap) and multiplying the area by an assumed placement depth of 2 feet.)									
				240,853.40		*298,910.51*		*356,587.65*
05 Locks	**1.00**	**EA**	**Sub**	**240,853**	**58,057**	**298,911**	**57,677**	**356,588**
				1,214.83		*1,507.66*		*1,798.58*
Demolish Railing Parallel to Land Lock Wall	**1.00**	**EA**	**Sub**	**1,215**	**293**	**1,508**	**291**	**1,799**
				2.58		*3.20*		*3.82*
RSM 024113660500 Selective demolition, misc metal fences & gates, metal tubular picket fences, 4'-6' high	320.00	LF	Sub	826	199	1,025	198	1,223
				25.93		*32.18*		*38.39*
RSM 024119180200 Selective demolition, disposal only, urban buildings with salvage value allowed, steel frame, includes loading and 5 mile haul to dump	15.00	CY	Sub	389	94	483	93	576
(Note: Increase bare cost by a factor of 3.0 since a 15-mile haul to dump is assumed for the project. Disposal Volume = 2 x Volume of posts and rails to account for bulking.)								

Currency in US dollars

Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
				12,671.78		*15,726.28*		*18,760.79*
Replace Railing Parallel to Land Lock Wall	**1.00**	**EA**	**Sub**	**12,672**	**3,055**	**15,726**	**3,035**	**18,761**
				39.60		*49.14*		*58.63*
RSM 055213500520 Railing, pipe, steel, primed, 2 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	320.00	LF	Sub	12,672	3,055	15,726	3,035	18,761
				177.00		*219.66*		*262.05*
Safety Signage	**1.00**	**EA**	**Sub**	**177**	**43**	**220**	**42**	**262**
				29.50		*36.61*		*43.67*
HTW 019413207911 Safety signs (yellow and magenta), aluminum/acrylic, 10" x 14"	6.00	EA	Sub	177	43	220	42	262
				125,176.89		*155,350.47*		*185,326.57*
Dredging to Open Gates	**1.00**	**EA**	**Sub**	**125,177**	**30,174**	**155,350**	**29,976**	**185,327**
				13.54		*16.80*		*20.04*
RSM 352023130310 Mechanical dredging, 20 miles, barge mounted clamshell excavation into scows, dumped at sea, minimum	2,500.00	BCY	Sub	33,844	8,158	42,002	8,105	50,106
(Note: The dredging volume was calculated by (1) dividing the dredging area into sections in plan view, (2) multiplying the plan area of each section by the average of the excavation depths at the beginning of the section and end of the section to get a volume, and (3) adding the volumes of each section to get a total dredging volume.)								
				28.10		*34.88*		*41.61*
USR USR Spoil Disposal	3,250.00	LCY	Sub	91,333	22,016	113,349	21,872	135,220
(Note: The Spoil Disposal task is made up of three items from the 2010 Cost Book: (1) 31 23 23 20 1625 Cycle hauling (wait, load,travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 30 min load/wait/unload, 12 CY truck, cycle 10 miles, 15 MPH, excludes loading equipment; (2) 31 23 16 42 0500 Excavating, bulk bank measure, 1/2 C.Y. capacity = 20 C.Y./hour, clamshell, excluding truck loading; (3) 31 23 23 17 0020 Fill, dumped material, spread, by dozer, excludes compaction. Spoil Disposal Volume = Total Dredging Volume x 1.30 (bulking factor for excavated soils).)								
				9,663.32		*11,992.64*		*14,306.72*
Pin Lower Gates Open	**1.00**	**EA**	**Sub**	**9,663**	**2,329**	**11,993**	**2,314**	**14,307**
(Note: The tie-back consist of a W section, a thin steel plate, and an anchor rod. The W-section size was assumed to be a W8x58 section based on similar designs at Kentucky River Lock No. 5, 6, & 7. Since this size was unavailable in 2010 RS Means, the larger W12x58 was chosen. The extra material and cost of the W12x58 was assumed to account for the steel required for the steel plate and anchor rod. Due to limited design drawings, the actual geometry of the lock gates and stiffeners is unknown. Therefore, the length of the weld between the W section and the gate stiffener was assumed to be 6 linear feet per W section.)								
				81.02		*100.55*		*119.95*
RSM 051223751580 Structural steel member, 100-ton project, 1 to 2 story building, W12x58, A992 steel, shop fabricated, incl shop primer, bolted connections	70.00	LF	Sub	5,671	1,367	7,038	1,358	8,396
				19.63		*24.36*		*29.06*
RSM 050521901610 Welding structural steel in field, single pass, 0.4 Lb/LF, 5/16" thick, continuous fillet, type 6011	50.00	LF	Sub	981	237	1,218	235	1,453
				60.22		*74.73*		*89.15*
RSM 050521904010 Welding structural steel in field, cleaning & welding plates/bars/rods to existing beams/columns/trusses	50.00	LF	Sub	3,011	726	3,736	721	4,457
				11,129.49		*13,812.23*		*16,477.40*
Restore Concrete Esplanade	**1.00**	**EA**	**Sub**	**11,129**	**2,683**	**13,812**	**2,665**	**16,477**
				24.73		*30.69*		*36.62*
RSM 321313230020 Concrete paving surface treatment, 4500 psi, fixed form, unreinforced, 12' pass, 6" thick, includes joints, finishing, and curing	450.00	SY	Sub	11,129	2,683	13,812	2,665	16,477

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Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
(Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)								
				23,871.28		*29,625.40*		*35,341.85*
Bracing	**1.00**	**EA**	**Sub**	**23,871**	**5,754**	**29,625**	**5,716**	**35,342**
(Note: Bracing is based on that used at KY River L&D3. The bracing consisted of heavy steel sections. The sections used here are similar, although some adjustments have been made to avoid using sections not found in the UPB. The quantities for each section used have been adapted for the geometry of the cells at Green River L&D3)								
				198.93		*246.88*		*294.52*
RSM 051223757500 Structural steel member, 100-ton project, 1 to 2 story building, W36x150, A992 steel, shop fabricated, incl shop primer, bolted connections	120.00	LF	Sub	23,871	5,754	29,625	5,716	35,342
				1,891.20		*2,347.06*		*2,799.95*
Restore Portion of County Road 1273 as Gravel Road	**1.00**	**EA**	**Sub**	**1,891**	**456**	**2,347**	**453**	**2,800**
(Note: This item covers restoration for a 140-foot-long and 15-foot-wide section of County Road 1273.)								
				7.88		*9.78*		*11.67*
RSM 015523500050 Temporary, roads, gravel fill, 4" gravel depth, excl surfacing	240.00	SY	Sub	1,891	456	2,347	453	2,800
				617.40		*766.22*		*914.07*
Site Restoration	**1.00**	**EA**	**Sub**	**617**	**149**	**766**	**148**	**914**
(Note: This item covers grading and seeding for an area equal to the clearing and grubbing area.)								
				0.15		*0.18*		*0.22*
RSM 312216103300 Fine grading, slopes, gentle, finish grading	1,000.00	SY	Sub	147	36	183	35	218
				0.47		*0.58*		*0.70*
RSM 329219131000 Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed	1,000.00	SY	Sub	470	113	583	113	696
(Note: This item covers seeding for an area equal to the clearing and grubbing area.)								
				16,251.13		*20,168.42*		*24,060.08*
Sheet Piling	**1.00**	**EA**	**Sub**	**16,251**	**3,917**	**20,168**	**3,892**	**24,060**
				20.31		*25.21*		*30.08*
RSM 314116101600 Sheet piling, steel, 27 psf, 20' excavation, drive, extract and salvage, excludes wales	800.00	SF	Sub	16,251	3,917	20,168	3,892	24,060
(Note: Braced sheet piles will serve as the temporary bulkhead wall at the lock. The area of sheet piling was calculated by multiplying the bulkhead height by the lock chamber width. The bulkhead height is the height from the top of the lock wall to the elevation of the upper sill.)								
				38,189.08		*47,394.47*		*56,539.61*
Derrick Stone	**1.00**	**EA**	**Sub**	**38,189**	**9,205**	**47,394**	**9,145**	**56,540**
				60.62		*75.23*		*89.75*
USR USR Derrick Stone Placement	630.00	TON	Sub	38,189	9,205	47,394	9,145	56,540
(Note: The USR CSI Task for derrick stone was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from Greenville Quarries, Contact is John Stovall (270) 338-2300. $48/ton for derrick stone delivered by truck to site, includes unloading time for delivery and truck driver. Production rate of 100 tons/hour derived by calculating the total time for placement of 900 tons of derrick stone. The calculation of the total time to place all of the derrick stone accounted for the time to complete the following tasks: -unload the rock from the delivery truck; -load the rock onto the material transport barge; -travel time for the barge; -unload the rock from the barge; and -placement of the derrick stone. The production rate was calculated by dividing 900 tons by the total time to place 900 tons (9 hours) which equals 100 tons/hour. The equipment for the crew consists of 2 cranes, 1 material transport barge, 1 work barge, and a tug boat. The labor for the crew for this task consists of 1 medium equipment operator that serves as the tug boat captain, 1 foreman, 1 equipment oiler, and 2 heavy equipment operators for the 2 cranes. This item covers the derrick stone for the buttress at the upper gates. The rock volume was calculated by (1) dividing the rock placement area into sections in plan view, (2) multiplying the plan area of each section by the average of the rock depths at the beginning of the section and end of the section to get a volume, (3) adding the volumes of each section to get a total volume of rock, and (4) multiplying the total volume of rock by a unit weight of 110 tons/CF that accounts for porosity to get the rock quantity.)								

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Description	Quantity	UOM	Contractor	DirectCost	SubCMU	CostToPrime	PrimeCMU	ContractCost
				26,868.00		*26,868.00*		*32,052.39*
30 Planning, Engineering and Design	**1.00**	**EA**	**Prime**	**26,868**	**0**	**26,868**	**5,184**	**32,052**
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of $337,702 which corresponds to the total project direct costs for all items except for Planning, Engineering, & Design.)								
USR USR Planning, Engineering, & Design	1.00	LS	Prime	26,868	0	26,868	5,184	32,052
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of $335,840 which corresponds to the total project direct cost for all items except for Planning, Engineering, & Design.)								

Currency in US dollars

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
Project Direct Costs Report			**88,162**	**81,220**	**166,458**	**26,868**	**0**	**362,708**	**362,708**	
			4,956.21	*9,489.14*	*80,541.45*	*0.00*		*94,986.79*	*94,986.79*	
04 Dams	**1.00**	**EA**	**4,956**	**9,489**	**80,541**	**0**	**0**	**94,987**	**94,987**	
			4,956.21	*9,489.14*	*80,541.45*	*0.00*		*94,986.79*	*94,986.79*	
0401 Main Dam	**1.00**	**EA**	**4,956**	**9,489**	**80,541**	**0**	**0**	**94,987**	**94,987**	
			3,974.53	*8,197.47*	*63,600.00*	*0.00*		*75,771.99*	*75,771.99*	
Derrick Stone	**1.00**	**EA**	**3,975**	**8,197**	**63,600**	**0**	**0**	**75,772**	**75,772**	
			3.18	*6.56*	*50.88*	*0.00*		*60.62*	*60.62*	
USR USR Derrick Stone Placement	1,250.00	TON	3,975	8,197	63,600	0	0	75,772	75,772	N
(Note: The USR CSI Task for derrick stone was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from Greenville Quarries, Contact is John Stovall (270) 338-2300. $48/ton for derrick stone delivered by truck to site, includes unloading time for delivery and truck driver. Production rate of 100 tons/hour derived by calculating the total time for placement of 900 tons of derrick stone. The calculation of the total time to place all of the derrick stone accounted for the time to complete the following tasks: -unload the rock from the delivery truck; -load the rock onto the material transport barge; -travel time for the barge; -unload the rock from the barge; and -placement of the derrick stone. The production rate was calculated by dividing 900 tons by the total time to place 900 tons (9 hours) which equals 100 tons/hour. The equipment for the crew consists of 2 cranes, 1 material transport barge, 1 work barge, and a tug boat. The labor for the crew for this task consists of 1 medium equipment operator that serves as the tug boat captain, 1 foreman, 1 equipment oiler, and 2 heavy equipment operators for the 2 cranes. The quantity for derrick stone was calculated by determining the area of placement and multiplying by a depth of 10 feet to get the volume of stone in cubic yards. A unit weight of 110 lb/cubic foot that accounts for porosity was used to convert from cubic yards of stone to tons.)											
			981.68	*1,291.67*	*16,941.45*	*0.00*		*19,214.80*	*19,214.80*	
Tremie Concrete	**1.00**	**EA**	**982**	**1,292**	**16,941**	**0**	**0**	**19,215**	**19,215**	
			6.54	*8.61*	*112.94*	*0.00*		*128.10*	*128.10*	
USR USR_033105350200 Structural concrete, ready mix, normal weight, 3500 psi, includes local aggregate, sand, Portland cement and water, delivered, excludes all additives and treatments	150.00	CY	982	1,292	16,941	0	0	19,215	19,215	M
(Note: This item covers concrete for slush grouting the derrick stone and the timber frame repairs. This USR CSI Task for tremie concrete was built by copying the the 03 31 05 35 0200 CSI Task from the Cost Book which provided only material costs and adding the Tremie Concrete Crew for labor and equipment costs.Add $1.05 per CY for Environmental and Energy Charges and $14.00 per cubic yard for anti wash out treatment per direction from a quote from imi, a local concrete vendor. So total material price/CY is $106.55/CY. Production rate is 100 CY/Hour Based on experience at KY River L&D3 cell dam. The equipment for the crew for this task consists of 1 concrete pump, 2 cranes, 2 barges, 1 tug boat, and 1 front-end loader. The laborers for this crew consist of 5 semi-skilled laborers, 1 oiler, 1 medium equipment operator for the tug boat, 1 foreman, and 2 heavy equipment operators for the cranes. The volume of concrete for slush grouting (120 CY) was calculated by multiplying the plan area of derrick stone placement and slush grouting by an assumed depth. The assumed depth for slush grouting was calculated by assuming that the slush grouting will extend to half of the depth of the derrick stone (10 feet); therefore, the assumed depth of slush grouting was calculated as 5 feet. The volume of concrete for repairs to the timber frame (360 CY) was calculated by determining the timber crib surface area (beneath the reinforced concrete cap) and multiplying the area by an assumed placement depth of 2 feet.)											
			83,205.44	*71,731.27*	*85,916.69*	*0.00*		*240,853.40*	*240,853.40*	
05 Locks	**1.00**	**EA**	**83,205**	**71,731**	**85,917**	**0**	**0**	**240,853**	**240,853**	
			949.17	*265.67*	*0.00*	*0.00*		*1,214.83*	*1,214.83*	
Demolish Railing Parallel to Land Lock Wall	**1.00**	**EA**	**949**	**266**	**0**	**0**	**0**	**1,215**	**1,215**	
			2.26	*0.32*	*0.00*	*0.00*		*2.58*	*2.58*	
RSM 024113660500 Selective demolition, misc metal fences & gates, metal tubular picket	320.00	LF	723	103	0	0	0	826	826	N

Currency in US dollars

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
fences, 4'-6' high										
			15.10	*10.83*	*0.00*	*0.00*		*25.93*	*25.93*	
RSM 024119180200 Selective demolition, disposal only, urban buildings with salvage value allowed, steel frame, includes loading and 5 mile haul to dump	15.00	CY	227	162	0	0	0	389	389	LE
(Note: Increase bare cost by a factor of 3.0 since a 15-mile haul to dump is assumed for the project. Disposal Volume = 2 x Volume of posts and rails to account for bulking.)										
			4,884.38	*155.40*	*7,632.00*	*0.00*		*12,671.78*	*12,671.78*	
Replace Railing Parallel to Land Lock Wall	**1.00**	**EA**	**4,884**	**155**	**7,632**	**0**	**0**	**12,672**	**12,672**	
			15.26	*0.49*	*23.85*	*0.00*		*39.60*	*39.60*	
RSM 055213500520 Railing, pipe, steel, primed, 2 rails, 3'-6" high, posts @ 5' O.C., 1-1/2" dia, shop fabricated	320.00	LF	4,884	155	7,632	0	0	12,672	12,672	N
			0.00	*0.00*	*177.00*	*0.00*		*177.00*	*177.00*	
Safety Signage	**1.00**	**EA**	**0**	**0**	**177**	**0**	**0**	**177**	**177**	
			0.00	*0.00*	*29.50*	*0.00*		*29.50*	*29.50*	
HTW 019413207911 Safety signs (yellow and magenta), aluminum/acrylic, 10" x 14"	6.00	EA	0	0	177	0	0	177	177	N
			61,996.75	*63,180.14*	*0.00*	*0.00*		*125,176.89*	*125,176.89*	
Dredging to Open Gates	**1.00**	**EA**	**61,997**	**63,180**	**0**	**0**	**0**	**125,177**	**125,177**	
			8.41	*5.13*	*0.00*	*0.00*		*13.54*	*13.54*	
RSM 352023130310 Mechanical dredging, 20 miles, barge mounted clamshell excavation into scows, dumped at sea, minimum	2,500.00	BCY	21,025	12,819	0	0	0	33,844	33,844	N
(Note: The dredging volume was calculated by (1) dividing the dredging area into sections in plan view, (2) multiplying the plan area of each section by the average of the excavation depths at the beginning of the section and end of the section to get a volume, and (3) adding the volumes of each section to get a total dredging volume.)										
			12.61	*15.50*	*0.00*	*0.00*		*28.10*	*28.10*	
USR USR Spoil Disposal	3,250.00	LCY	40,972	50,361	0	0	0	91,333	91,333	N
(Note: The Spoil Disposal task is made up of three items from the 2010 Cost Book: (1) 31 23 23 20 1625 Cycle hauling (wait, load,travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 30 min load/wait/unload, 12 CY truck, cycle 10 miles, 15 MPH, excludes loading equipment; (2) 31 23 16 42 0500 Excavating, bulk bank measure, 1/2 C.Y. capacity = 20 C.Y./hour, clamshell, excluding truck loading; (3) 31 23 23 17 0020 Fill, dumped material, spread, by dozer, excludes compaction. Spoil Disposal Volume = Total Dredging Volume x 1.30 (bulking factor for excavated soils).)										
			3,833.89	*522.54*	*5,306.89*	*0.00*		*9,663.32*	*9,663.32*	
Pin Lower Gates Open	**1.00**	**EA**	**3,834**	**523**	**5,307**	**0**	**0**	**9,663**	**9,663**	
(Note: The tie-back consist of a W section, a thin steel plate, and an anchor rod. The W-section size was assumed to be a W8x58 section based on similar designs at Kentucky River Lock No. 5, 6, & 7. Since this size was unavailable in 2010 RS Means, the larger W12x58 was chosen. The extra material and cost of the W12x58 was assumed to account for the steel required for the steel plate and anchor rod. Due to limited design drawings, the actual geometry of the lock gates and stiffeners is unknown. Therefore, the length of the weld between the W section and the gate stiffener was assumed to be 6 linear feet per W section.)										
			5.44	*1.38*	*74.20*	*0.00*		*81.02*	*81.02*	
RSM 051223751580 Structural steel member, 100-ton project, 1 to 2 story building, W12x58,	70.00	LF	381	97	5,194	0	0	5,671	5,671	N

Currency in US dollars

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
A992 steel, shop fabricated, incl shop primer, bolted connections										
			16.58	*2.04*	*1.01*	*0.00*		*19.63*	*19.63*	
RSM 050521901610 Welding structural steel in field, single pass, 0.4 Lb/LF, 5/16" thick, continuous fillet, type 6011	50.00	LF	829	102	50	0	0	981	981	N
			52.49	*6.47*	*1.25*	*0.00*		*60.22*	*60.22*	
RSM 050521904010 Welding structural steel in field, cleaning & welding plates/bars/rods to existing beams/columns/trusses	50.00	LF	2,624	324	63	0	0	3,011	3,011	N
			786.12	*326.37*	*10,017.00*	*0.00*		*11,129.49*	*11,129.49*	
Restore Concrete Esplanade	**1.00**	**EA**	**786**	**326**	**10,017**	**0**	**0**	**11,129**	**11,129**	
			1.75	*0.73*	*22.26*	*0.00*		*24.73*	*24.73*	
RSM 321313230020 Concrete paving surface treatment, 4500 psi, fixed form, unreinforced, 12' pass, 6" thick, includes joints, finishing, and curing	450.00	SY	786	326	10,017	0	0	11,129	11,129	N
(Note: Total area of esplanade is 867 SY. Assume 50% of esplanade will need restoration.)										
			606.81	*114.08*	*23,150.40*	*0.00*		*23,871.28*	*23,871.28*	
Bracing	**1.00**	**EA**	**607**	**114**	**23,150**	**0**	**0**	**23,871**	**23,871**	
(Note: Bracing is based on that used at KY River L&D3. The bracing consisted of heavy steel sections. The sections used here are similar, although some adjustments have been made to avoid using sections not found in the UPB. The quantities for each section used have been adapted for the geometry of the cells at Green River L&D3)										
			5.06	*0.95*	*192.92*	*0.00*		*198.93*	*198.93*	
RSM 051223757500 Structural steel member, 100-ton project, 1 to 2 story building, W36x150, A992 steel, shop fabricated, incl shop primer, bolted connections	120.00	LF	607	114	23,150	0	0	23,871	23,871	N
			819.46	*54.13*	*1,017.60*	*0.00*		*1,891.20*	*1,891.20*	
Restore Portion of County Road 1273 as Gravel Road	**1.00**	**EA**	**819**	**54**	**1,018**	**0**	**0**	**1,891**	**1,891**	
(Note: This item covers restoration for a 140-foot-long and 15-foot-wide section of County Road 1273.)										
			3.41	*0.23*	*4.24*	*0.00*		*7.88*	*7.88*	
RSM 015523500050 Temporary, roads, gravel fill, 4" gravel depth, excl surfacing	240.00	SY	819	54	1,018	0	0	1,891	1,891	N
			252.03	*163.97*	*201.40*	*0.00*		*617.40*	*617.40*	
Site Restoration	**1.00**	**EA**	**252**	**164**	**201**	**0**	**0**	**617**	**617**	
(Note: This item covers grading and seeding for an area equal to the clearing and grubbing area.)										
			0.11	*0.04*	*0.00*	*0.00*		*0.15*	*0.15*	
RSM 312216103300 Fine grading, slopes, gentle, finish grading	1,000.00	SY	108	40	0	0	0	147	147	N
			0.14	*0.12*	*0.20*	*0.00*		*0.47*	*0.47*	
RSM 329219131000 Seeding, mechanical	1,000.00	SY	144	124	201	0	0	470	470	N

Currency in US dollars

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectCost	DirectCost	CostOverride
seeding hydro or air seeding for large areas, includes lime, fertilizer and seed (Note: This item covers seeding for an area equal to the clearing and grubbing area.)										
			7,073.68	*2,817.45*	*6,360.00*	*0.00*		*16,251.13*	*16,251.13*	
Sheet Piling	**1.00**	**EA**	**7,074**	**2,817**	**6,360**	**0**	**0**	**16,251**	**16,251**	
			8.84	*3.52*	*7.95*	*0.00*		*20.31*	*20.31*	
RSM 314116101600 Sheet piling, steel, 27 psf, 20' excavation, drive, extract and salvage, excludes wales	800.00	SF	7,074	2,817	6,360	0	0	16,251	16,251	N
(Note: Braced sheet piles will serve as the temporary bulkhead wall at the lock. The area of sheet piling was calculated by multiplying the bulkhead height by the lock chamber width. The bulkhead height is the height from the top of the lock wall to the elevation of the upper sill.)										
			2,003.16	*4,131.52*	*32,054.40*	*0.00*		*38,189.08*	*38,189.08*	
Derrick Stone	**1.00**	**EA**	**2,003**	**4,132**	**32,054**	**0**	**0**	**38,189**	**38,189**	
			3.18	*6.56*	*50.88*	*0.00*		*60.62*	*60.62*	
USR USR Derrick Stone Placement	630.00	TON	2,003	4,132	32,054	0	0	38,189	38,189	N
(Note: The USR CSI Task for derrick stone was built by determining material costs, estimating a production rate, and creating a USR crew of equipment and laborers. Material cost from Greenville Quarries, Contact is John Stovall (270) 338-2300. $48/ton for derrick stone delivered by truck to site, includes unloading time for delivery and truck driver. Production rate of 100 tons/hour derived by calculating the total time for placement of 900 tons of derrick stone. The calculation of the total time to place all of the derrick stone accounted for the time to complete the following tasks: -unload the rock from the delivery truck; -load the rock onto the material transport barge; -travel time for the barge; -unload the rock from the barge; and -placement of the derrick stone. The production rate was calculated by dividing 900 tons by the total time to place 900 tons (9 hours) which equals 100 tons/hour. The equipment for the crew consists of 2 cranes, 1 material transport barge, 1 work barge, and a tug boat. The labor for the crew for this task consists of 1 medium equipment operator that serves as the tug boat captain, 1 foreman, 1 equipment oiler, and 2 heavy equipment operators for the 2 cranes. This item covers the derrick stone for the buttress at the upper gates. The rock volume was calculated by (1) dividing the rock placement area into sections in plan view, (2) multiplying the plan area of each section by the average of the rock depths at the beginning of the section and end of the section to get a volume, (3) adding the volumes of each section to get a total volume of rock, and (4) multiplying the total volume of rock by a unit weight of 110 tons/CF that accounts for porosity to get the rock quantity.)										
			0.00	*0.00*	*0.00*	*26,868.00*		*26,868.00*	*26,868.00*	
30 Planning, Engineering and Design	**1.00**	**EA**	**0**	**0**	**0**	**26,868**	**0**	**26,868**	**26,868**	
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of $337,702 which corresponds to the total project direct costs for all items except for Planning, Engineering, & Design.)										
USR USR Planning, Engineering, & Design	1.00	LS	0	0	0	26,868	0	26,868	26,868	Sb
(Note: Costs based on 8% of Project Direct Cost per James J. Vermillion, CCC, Cost Engineer, USACE Louisville District. Used 8% of $335,840 which corresponds to the total project direct cost for all items except for Planning, Engineering, & Design.)										

Currency in US dollars

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectShip	DirectCost	C/O
Job Office Overhead Direct Cost Report										
Prime										
Sub										
			133,256.45	*55,934.52*	*27,378.74*	*11,524.00*		*0.00*	*228,093.71*	
Overhead	**1.00**	**EA**	**133,256**	**55,935**	**27,379**	**11,524**	**0**	**0**	**228,094**	
			0.00	*0.00*	*0.00*	*0.00*		*0.00*	*0.00*	
USR ST Small Tools	1.00	EA	0	0	0	0	0	0	0	
			0.00	*0.00*	*0.00*	*0.00*		*0.00*	*0.00*	
USR ST Small Tools	1.00	EA	0	0	0	0	0	0	0	
			1,209.81	*0.00*	*5,351.94*	*354.00*		*0.00*	*6,915.75*	
Job Office	**1.00**	**EA**	**1,210**	**0**	**5,352**	**354**	**0**	**0**	**6,916**	
			0.00	*0.00*	*801.36*	*88.50*		*0.00*	*889.86*	
USR USR Job Office Expenses	4.00	MO	0	0	3,205	354	0	0	3,559	
			1,209.81	*0.00*	*2,146.50*	*0.00*		*0.00*	*3,356.31*	
RSM 015113500060 Temporary electrical power equipment (pro-rated per job), overhead feed, 3 uses, 600 amp	1.00	EA	1,210	0	2,147	0	0	0	3,356	
			52,147.00	*7,485.62*	*0.00*	*10,652.00*		*0.00*	*70,284.62*	
Civil Superintendent	**1.00**	**EA**	**52,147**	**7,486**	**0**	**10,652**	**0**	**0**	**70,285**	
			13,036.75	*1,871.40*	*0.00*	*2,663.00*		*0.00*	*17,571.15*	
USR USR_013113200310 Civil superintendent	4.00	MO	52,147	7,486	0	10,652	0	0	70,285	
(Note: Assume civil superintendent works from May 2015 - August 2015 for a total of 4 months. SubBid Cost consists of per diem/month for site superintendent. Per diem rate obtained from GSA FY 2011 Per Diem Rates for Kentucky - http://www.gsa.gov/portal/category/100120 $77/day for lodging + $46/day for meals and incidental expenses = $123/day per diem. $123/day per diem x 5 days/week x 4.33 weeks/month = $2663 per diem/month. Equipment cost consists of 4x4 truck for superintendent's use.)										
			0.00	*0.00*	*0.00*	*518.00*		*0.00*	*518.00*	
Laboratory Testing	**1.00**	**EA**	**0**	**0**	**0**	**518**	**0**	**0**	**518**	
			0.00	*0.00*	*0.00*	*259.00*		*0.00*	*259.00*	
RSM 014523502600 Concrete testing, mix design, one batch mix	2.00	EA	0	0	0	518	0	0	518	
			1,365.77	*90.22*	*1,696.00*	*0.00*		*0.00*	*3,151.99*	
Maintain Access and Parking Areas	**1.00**	**EA**	**1,366**	**90**	**1,696**	**0**	**0**	**0**	**3,152**	
			3.41	*0.23*	*4.24*	*0.00*		*0.00*	*7.88*	
RSM 015523500050 Temporary, roads, gravel fill, 4" gravel depth, excl surfacing	400.00	SY	1,366	90	1,696	0	0	0	3,152	
(Note: Provides one parking area south of East Abutment Cell and a second parking area north of the concrete esplanade at the lock.)										
			132.85	*0.00*	*20,330.80*	*0.00*		*0.00*	*20,463.65*	

Currency in US dollars

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectShip	DirectCost	C/O
Sediment Control	**1.00**	**EA**	**133**	**0**	**20,331**	**0**	**0**	**0**	**20,464**	
			0.66	*0.00*	*0.42*	*0.00*		*0.00*	*1.09*	
RSM 312513101100 Synthetic erosion control, silt fence, polypropylene, adverse conditions, 3' high	200.00	LF	133	0	85	0	0	0	218	
			0.00	*0.00*	*10,123.00*	*0.00*		*0.00*	*10,123.00*	
USR Silt Curtain	2.00	EA	0	0	20,246	0	0	0	20,246	
(Note: Costs from KY LD3 Estimate Alan Rauch: Call to Elastec/American Marine on 14Jan08 (rep = Duane Bennish 800-871-4156 ext 17) For 200 ft by 25 deep, for heavy flow conditions - Panels: 2 @ $3210 each - Anchors 8 @ $300 each - Toe Bridles 4 @ $77 each. 2008 cost per curtain is $9500. Multiply $9500 x 0.52% to escalate from 2008 to 2010.)										
			0.00	*4,341.66*	*0.00*	*0.00*		*0.00*	*4,341.66*	
4x4 Trucks	**1.00**	**EA**	**0**	**4,342**	**0**	**0**	**0**	**0**	**4,342**	
			0.00	*10.85*	*0.00*	*0.00*		*0.00*	*10.85*	
GEN T50Z7320 TRUCK, HIGHWAY, CONVENTIONAL, 8,800 LB (3,992 KG) GVW, 4X4, 2 AXLE, 3/4 TON (0.68 MT) - PICKUP	400.00	HR	0	4,342	0	0	0	0	4,342	
			1,803.21	*572.44*	*0.00*	*0.00*		*0.00*	*2,375.64*	
Clearing and Grubbing	**1.00**	**EA**	**1,803**	**572**	**0**	**0**	**0**	**0**	**2,376**	
			9,016.03	*2,862.18*	*0.00*	*0.00*		*0.00*	*11,878.21*	
RSM 311110100300 Clearing & grubbing, heavy trees, to 24" diameter, cut and chip	0.20	ACR	1,803	572	0	0	0	0	2,376	
			76,597.82	*43,444.59*	*0.00*	*0.00*		*0.00*	*120,042.41*	
Equipment Mobilization	**1.00**	**EA**	**76,598**	**43,445**	**0**	**0**	**0**	**0**	**120,042**	
			70,115.38	*39,363.39*	*0.00*	*0.00*		*0.00*	*109,478.77*	
Barge Mobilization	**1.00**	**EA**	**70,115**	**39,363**	**0**	**0**	**0**	**0**	**109,479**	
RSM 352023130100 Mechanical dredging, mobilization and demobilization, add to below, maximum	2.00	LS	70,115	39,363	0	0	0	0	109,479	
(Note: This item covers mobilization and demobilization for a barge and tugboat. Assume two mobilization and demobilizations to cover the two barges (1 work barge and 1 material transport barge).)										
			162.01	*194.72*	*0.00*	*0.00*		*0.00*	*356.74*	
Backhoe Mobilization	**1.00**	**EA**	**162**	**195**	**0**	**0**	**0**	**0**	**357**	
			81.01	*97.36*	*0.00*	*0.00*		*0.00*	*178.37*	
RSM 015436500020 Mobilization or demobilization, dozer, loader, backhoe or excavator, 70 H.P. to 150 H.P., up to 50 miles	2.00	EA	162	195	0	0	0	0	357	
(Note: Quantity is 2 to cover 1 mobilization and 1demobilization.)										
			162.01	*194.72*	*0.00*	*0.00*		*0.00*	*356.74*	
Front End Loader Mobilization	**1.00**	**EA**	**162**	**195**	**0**	**0**	**0**	**0**	**357**	
			81.01	*97.36*	*0.00*	*0.00*		*0.00*	*178.37*	
RSM 015436500020 Mobilization or demobilization, dozer, loader, backhoe or excavator, 70 H.P. to 150 H.P., up to 50 miles	2.00	EA	162	195	0	0	0	0	357	
(Note: Quantity is 2 to cover 1 mobilization and 1demobilization.)										

Currency in US dollars

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	DirectUserCost	DirectShip	DirectCost	C/O
			6,158.42	*3,691.75*	*0.00*	*0.00*		*0.00*	*9,850.17*	
Crane Mobilization	**1.00**	**EA**	**6,158**	**3,692**	**0**	**0**	**0**	**0**	**9,850**	
			4,316.65	*2,859.70*	*0.00*	*0.00*		*0.00*	*7,176.35*	
Assembly Crew for Cranes	**1.00**	**EA**	**4,317**	**2,860**	**0**	**0**	**0**	**0**	**7,176**	
(Note: Assume 1, 10-hour day per crane per mobilization or demobilization for a total of 40hours for the assembly crew (2 cranes x 2 mob/demob trips/crane x 10 hours/mob/demob trip).)										
			107.92	*71.49*	*0.00*	*0.00*		*0.00*	*179.41*	
RSM A3G A3G	40.00	HR	4,317	2,860	0	0	0	0	7,176	
			1,151.11	*762.59*	*0.00*	*0.00*		*0.00*	*1,913.69*	
150-ton Crawler Crane Mobilization	**1.00**	**EA**	**1,151**	**763**	**0**	**0**	**0**	**0**	**1,914**	
			575.55	*381.29*	*0.00*	*0.00*		*0.00*	*956.85*	
RSM 015436502300 Mobilization or demobilization, crane, crawler-mounted, over 75 ton	2.00	EA	1,151	763	0	0	0	0	1,914	
(Note: Quantity is 2 to cover 1 mobilization and 1 demobilization.)										
			690.66	*69.47*	*0.00*	*0.00*		*0.00*	*760.13*	
100-ton Wheeled Crane Mobilization	**1.00**	**EA**	**691**	**69**	**0**	**0**	**0**	**0**	**760**	
			345.33	*34.73*	*0.00*	*0.00*		*0.00*	*380.07*	
RSM 015436502100 Mobilization or demobilization, crane, truck-mounted, over 75 ton	2.00	EA	691	69	0	0	0	0	760	
(Note: Quantity is 2 to cover 1 mobilization and 1 demobilization.)										

Currency in US dollars